Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A process for producing hydrocarbons, comprising:

contacting a feed stream comprising carbon monoxide and hydrogen with a bulk cobalt-based catalyst so as to convert at least a portion of said feed stream to hydrocarbons,

wherein the bulk cobalt-based catalyst comprises an average cobalt oxide crystallite size between 10 and 40 nm, and has a BET surface area between 10 and 150 m^2/g, and further comprises

between about 40 and about 90 percent by weight of cobalt;

a textural promoter selected from the group consisting of zirconium, chromium, magnesium, cerium, and titanium;

optionally, a Group I metal; and

between 5 and 60 percent by weight of a binder selected from the group consisting of silica, alumina, titania, zirconia, and combinations thereof.

2. (Original) The process of claim 1 wherein the textural promoter is zirconium.

3. (Original) The process of claim 2 wherein the bulk cobalt-based catalyst comprises between about 2 and about 5 percent zirconium by weight.

4. (Original) The process of claim 1 wherein the bulk cobalt-based catalyst further comprises a Group I metal.

5. (Original) The process of claim 4 wherein the Group I metal is potassium.

6. (Original) The process according to claim 1 wherein the bulk cobalt-based catalyst has an attrition loss less than 40%.

7. (Original) The process of claim 1 wherein the bulk cobalt-based catalyst is made by a method that comprises

(a) forming a cobalt precipitate, wherein said forming a precipitate comprises mixing a cobalt compound and a compound of a textural promoter with a precipitating agent so as to cause precipitation of said compounds;

(b) mixing said cobalt precipitate with a binder derived from at least 2 binder precursors so as to form a slurry;

(c) drying said slurry in a spraydrier so as to form a bulk material precursor in the form of particles; and

(d) calcining the bulk material precursor at a temperature between about 200°C and about 900°C so as to form the bulk cobalt-based catalyst.

8. (Original) The process of claim 7 wherein the binder is silica, and the binder is derived from silicic acid and colloidal silica sol.

9. (Original) The process of claim 7 wherein the method further comprises adding a precursor of a Group I metal to the mixture in step (a) or to the slurry in step (b).

10. (Original) The process of claim 7 wherein the precipitating agent comprises urea, sodium carbonate, ammonium carbonate, or ammonium hydroxide.

11. (Original) The process of claim 1 wherein the bulk cobalt-based catalyst is made by a method that comprises

(a) forming a cobalt precipitate, wherein said forming a precipitate comprises mixing a cobalt compound and a compound of a textural promoter with a precipitating agent so as to cause precipitation of said compounds;

(b) mixing said cobalt precipitate with a binder so as to form a slurry;

(c) drying said slurry in a spraydrier so as to form a bulk material precursor in the form of particles;

(d) calcining the bulk material precursor at a temperature between about 200°C and about 900°C so as to form a bulk cobalt-based catalyst; and further

wherein the method includes an acid treatment step comprising treating the cobalt precipitate with an acidic solution or treating the bulk cobalt-based catalyst with an acidic solution.

12. (Original) The process according to claim 11 wherein said binder in Step (b) is in the form of a colloidal sol, a binder precursor, or combination thereof.

13. (Original) The process according to claim 11 wherein said binder comprises silica, and the binder in Step (b) is in the form of silicic acid, colloidal silica sol, or combination thereof.

14. (Original) The process according to claim 11 wherein the acidic solution comprises nitric acid.

15. (Original) The process of claim 11 wherein the method further comprises adding a precursor of a Group I metal to the mixture in step (a) or to the slurry in step (b).

16. (Original) The process of claim 15 wherein the group I metal comprises potassium.

17. (Original) The process of claim 1 wherein said hydrocarbons comprise hydrocarbons with 5 or more carbon atoms.

18-42. (Cancelled)

43. (New) The process according to claim 1 wherein the bulk cobalt-based catalyst has an attrition loss less than 30%.

44. (New) The process according to claim 1 wherein the bulk cobalt-based catalyst comprises a BET surface area between about 80 and about 150 square meters per gram of catalyst.

45. (New) The process according to claim 1 wherein the bulk cobalt-based catalyst comprises from about 0.1 and 10 percent by weight of the textural promoter.

46. (New) The process according to claim 1 wherein the bulk cobalt-based catalyst comprises from about 2 and about 5 percent by weight of the textural promoter.

47. (New) The process according to claim 1 wherein the bulk cobalt-based catalyst comprises between about 40 and about 85 percent by weight of cobalt.

48. (New) The process according to claim 1 wherein the bulk cobalt-based catalyst comprises from about 10 and about 60 percent by weight of the binder.

49. (New) The process according to claim 1 wherein the binder comprises silica, alumina or combinations thereof.

50. (New) The process according to claim 1 wherein the bulk cobalt-based catalyst comprises between about 0.05 and 5 wt.% of a Group I metal.

51. (New) The process according to claim 1 wherein the bulk cobalt-based catalyst comprises between about 0.1 and about 0.2 wt. % of a Group I metal.

52. (New) The process according to claim 1 wherein the bulk cobalt-based catalyst further comprises a non-Group I Fischer-Tropsch metal selected from the group consisting of rhenium, ruthenium, platinum, palladium, boron, silver, and combinations thereof.

53. (New) The process according to claim 5 wherein the catalyst comprises between about 0.05 and 5 percent potassium by weight.

54. (New) The process according to claim 1 wherein the catalyst is disposed in a slurry bed or slurry bubble column, and comprises an average particle size between about 40 microns and about 100 microns.

55. (New) The process according to claim 1 wherein the binder in the catalyst is derived from a precursor compound of the binder and from a sol of the binder.

56. (New) The process according to claim 55 wherein the binder sol includes particles having an average size between 10 and 100 nm.

57. (New) The process according to claim 55 wherein the catalyst includes 5-15 wt. % binder derived from a binder precursor compound and 10-40 wt % binder derived from a binder sol.

58. (New) The process according to claim 55 wherein the catalyst includes 5-15 wt. % binder derived from a precursor compound of the binder and 35-50 wt. % binder derived from a binder sol.

59. (New) The process according to claim 55 wherein the binder comprises silica, and includes 5-15 wt. % silica derived from silicic acid and 35-50 wt. % silica derived from a colloidal silica sol.

60. (New) The process according to claim 55 wherein the binder comprises silica, and includes 5-15 wt. % silica derived from silicic acid and 10-20 wt. % silica derived from a colloidal silica sol.

61. (New) The process according to claim 7 wherein the at least 2 binder precursors comprise a binder precursor compound and a binder sol.

62. (New) The process according to claim 7 wherein the method of making the bulk cobalt-based catalyst further includes an acid treatment step comprising treating the cobalt precipitate with an acidic solution or treating the bulk cobalt-based catalyst with an acidic solution.

63. (New) The process according to claim 11 wherein forming the precipitate is carried out at a temperature maintained at a constant value between 30°C and 90°C.

64. (New) The process according to claim 11 wherein forming the precipitate is carried out at a pH maintained at a constant value between about 6.5 and about 8.5.

65. (New) The process according to claim 11 wherein the acidic solution has a pH between about 0.1 and about 3.

66. (New) The process according to claim 11 wherein the calcining step proceeds at a temperature between about 400°C and about 800°C.

67. (New) The process according to claim 1 wherein said hydrocarbons comprise at least one product selected from the group consisting of wax, diesel fuel, kerosene, jet fuel, heating oil, and gasoline.